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## PATENT ABSTRACTS OF JAPAN

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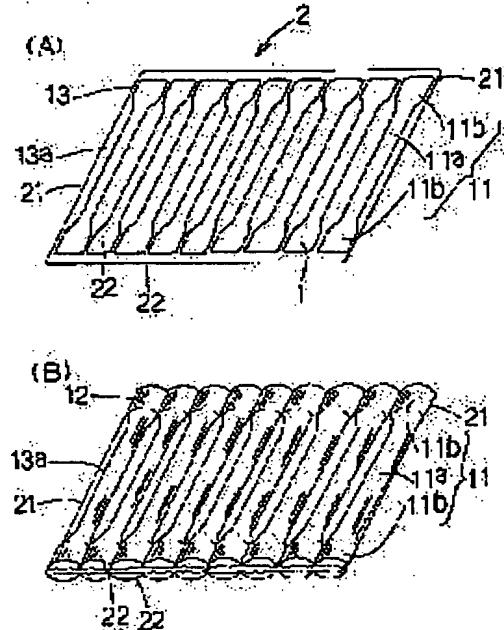
## (54) AIR-FILLED CUSHIONING MATERIAL

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a cushioning material which is not bulkier than a conventional Styrofoam one.

**SOLUTION:** In this winding type cushioning material, vertically formed small cells 11 are partitioned for formation in such a manner as to continue in a horizontal direction; and when the small cells 11 are filled with air, a step 12 is formed in a boundary between a vertical intermediate part 11a and both vertical ends 11b. Thus, an object to be protected can be surely held; and the air, which is infilled into the cells 11, is removed, so that volume can be easily reduced and so that the cushioning material can be prevented from being bulky in disposal.

FIG. 1



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**CLAIMS**

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**[Claim(s)]**

[Claim 1] In the shock absorbing material (2) with which the air enclosure section (1) is formed between superposition and each sheet in the sheet made of elasticity resin without permeability. The air enclosure sections (1) are a series of vesicles (11) formed in the vertical direction, and it is that by which this vesicle (11) follows a longitudinal direction, and is formed and divided. To this vesicle (11) When the interior is filled up with air, a level difference (12) is formed in the boundary line of the interstitial segment (11a) and ends part (11b) in the vertical direction. This level difference (12) Air enclosure shock absorbing material with which the above-mentioned ends part (11b) is characterized by being what is formed so that the thickness of a vesicle (11) may become large rather than an interstitial segment (11a) in the condition that air was enclosed with the vesicle (11).

[Claim 2] shock absorbing material (2) — at least — right and left — one of edges (21) — or — at least — a front flesh side — the air enclosure shock absorbing material according to claim 1 characterized by forming a junction means (23) in one of side faces [ a part of ] (22).

[Claim 3] In the shock absorbing material (2) with which the air enclosure section (1) is formed between superposition and each sheet in the sheet made of elasticity resin without permeability. Air enclosure shock absorbing material characterized by for the air enclosure section (1) having an adjacent crevice (1a, 11a) and heights (1b, 11b), and being able to make a protection object (3) contact to this crevice (1a, 11a).

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

#### [0001]

[Field of the Invention] The invention in this application relates to air enclosure shock absorbing material.

#### [0002]

[Description of the Prior Art] The approach of packing up by putting into boxes, such as a product made from corrugated paper, after protecting a corner and a side face from the former with shock absorbing material, such as a product made from styrene foam, to protection objects, such as an electric product, was performed widely. Since according to this approach it is absorbed with this shock absorbing material even if an impact starts from the exterior of a box, a protection object is kept. However, it was a problem that this shock absorbing material is bulky at the time of abolition and the storage after an activity.

#### [0003]

[Problem(s) to be Solved by the Invention] The invention in this application makes it a technical problem to offer the shock absorbing material which is not bulky in view of these problems.

#### [0004]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, it sets to this application the 1st invention. In the shock absorbing material 2 with which the air enclosure section 1 is formed between superposition and each sheet in the sheet made of elasticity resin without permeability The air enclosure sections 1 are a series of vesicles 11 formed in the vertical direction, and it is that by which this vesicle 11 follows a longitudinal direction, and is formed and divided. To this vesicle 11 When the interior is filled up with air, a level difference 12 is formed in the boundary line of interstitial segment 11a and ends partial 11b in the vertical direction. This level difference 12 In the condition that air was enclosed with the vesicle 11, the above-mentioned ends partial 11b offers the air enclosure shock absorbing material characterized by being what formed so that the thickness of a vesicle 11 may become large rather than interstitial segment 11a. In addition, the expression of the "four directions" in the invention in this application does not show relative physical relationship, and, thereby, a busy condition etc. is not limited. Moreover, the expression "thickness" can be set in the direction of a front flesh side of shock absorbing material. The same is said of the following explanation.

[0005] this application the 2nd invention — setting — the 1st invention — setting — shock absorbing material 2 — at least — right and left — one of the edges 21 — or — at least — a front flesh side — the air enclosure shock absorbing material according to claim 1 characterized by forming the junction means 23 in one of side faces [ a part of ] 22 is offered.

[0006] In the shock absorbing material 2 with which the air enclosure section 1 is formed between superposition and each sheet in the sheet made of elasticity resin which does not have permeability in this application the 3rd invention The air enclosure section 1 has adjacent Crevices 1a and 11a and Heights 1b and 11b, and offers the air enclosure shock absorbing material characterized by the ability to make the protection object 3 contact to these crevices 1a and 11a.

#### [0007]

[Embodiment of the Invention] Next, an example of the gestalt of operation concerning the invention in this application is explained with drawing. Drawing 1 is the perspective view of the shock absorbing material in which an example of the gestalt of operation is shown, and drawing 4 is the perspective view showing the busy condition of this shock absorbing material.

[0008] Elasticity resin sheets, such as a product made from polyethylene without permeability, are used for the sheet of the ingredient which constitutes the shock absorbing material of the invention in this application. Two rectangular sheets are used in this example. To some of these sheets, a seal 13 is formed by means, such as thermocompression bonding, and, thereby, the vesicle 11 as shown in drawing 1 (A) is formed by this example. In addition, although the sheet is made into two sheets in this example, it is good also as what folds up one sheet, and this shock absorbing material can be formed with various means. In this example, this vesicle 11 is the long and slender space of the shape of a strip of paper formed in the vertical direction, and forms the air enclosure section 1 by continuing and forming this vesicle in plurality and a longitudinal direction.

[0009] As it juts over a longitudinal direction out of the seal 13 which separates each vesicle as shown in drawing 2 (A), seal 13a for drawing is formed in interstitial segment 11a in the vertical direction of this vesicle 11, thereby, when air is enclosed with a vesicle 11, as shown in drawing 3, interstitial segment 11a is thin, and ends partial 11b swells thickly. The configuration of seal 13a for drawing may be good also as what carries out the seal of the whole part required as shown in drawing 2 (A), in order to extract interstitial segment 11a, and may be the thing of linear [ intermittent ], as shown in drawing 2 (B), and punctiform as shown in drawing 2 (C). Moreover, you may form by other graphic forms and patterns, and it can carry out with various gestalten. As mentioned above, when a difference is made to the thickness at the time of air enclosure of a vesicle 11, a level difference 12 is formed in the boundary part of interstitial segment 11a and ends partial 11b. If shock absorbing material 2 is twisted to the protection object 3 as shown in drawing 4, since the protection object 3 will contact interstitial segment 11a as shown in drawing 3 and the protection object 3 will be caught in a level difference 12, as for the protection object 3, maintenance is made to the vertical direction. It is good also as what is stored in a carton box 4 as usual from the above-mentioned condition, and shock absorbing material 2 is used as a packing material, that is, it is good also as a condition [ having exposed as it is ]. In addition, it is good for the front face of shock absorbing material 2 also as what aimed at visual effectiveness as what ornamented the pattern etc. in this case.

[0010] By using it as mentioned above, it is possible to achieve the same function as the shock absorbing material made from the conventional styrene foam. And by extracting the air with which it filled up in the vesicle 11, the volume shall be reduced easily and it shall not be bulky at the time of abolition, either.

[0011] In addition, in order to extract the air in a vesicle 11 at the time of abolition, it is good for this shock absorbing material 2 also as what prepares slitting for making end \*\*\*\* of each vesicle 11 easy etc. Moreover, closedown means and check valves, such as a chuck, are prepared in each vesicle 11, and it is good also as what can take the air in a vesicle 11 suitably. Thereby, it also becomes possible to reuse this shock absorbing material 2.

[0012] Moreover, although it ranks with a longitudinal direction in the shape of a straight line by this example about the physical relationship of the level difference 12 between each vesicle 11 arranged in parallel as shown in drawing 1 (B) The invention in this application is not restricted to this, and according to the configuration of the protection object 3, it may form a level difference 12 so that various gestalten, such as a curvilinear configuration and the shape of linear [ of the direction of slant ], may be taken, and it may form it so that it may have the configuration which will be in the optimal contact condition to the protection object 3.

[0013] Although this shock absorbing material 2 changes also with structures of a vesicle 11 about enclosure of the air over a vesicle 11, it is good also as what encloses air beforehand, and twists shock absorbing material 2 before enclosing air with the protection object 3, and you may make it enclose air after that, although it is used to the protection object 3, twisting as shown in drawing 4 as already explained above.

[0014] Moreover, about this shock absorbing material 2, it is good also as what has the junction

means 23, such as chuck 23a shown in the ends part 21 and the table background side 22 on either side at drawing 5 (A), and surface fastener 23b shown in drawing 5 (B). Thereby, where shock absorbing material 2 is twisted around the protection object 3, shock absorbing material 2 comrades are fixable with the above-mentioned junction means. For this reason, the protection object 3 can be rolled easily. in addition, the ends part 21 and the table background side 22 are good also as what forms the junction means 23 in the both — carrying out — either — it is good also as what is formed in every [ one of the two ]. Therefore, it can carry out by changing into various things. Moreover, although a graphic display is not carried out, the ends partial 21 above-mentioned comrades are pasted up beforehand, and it is good also as what formed the appearance in tubed.

[0015] Next, other examples of the invention in this application are described. In addition, the same notation is given to the element which has the same function, and the explanation is omitted. What is shown in drawing 6 (A) is taken as the condition of not extracting interstitial segment 11a', among vesicles 11 about the part near [ in the longitudinal direction of shock absorbing material 2 ] ends. Thereby, crevice 1a is formed in a part for a center section, and heights 1b is formed in a perimeter part, respectively. Moreover, without what is shown in drawing 6 (B) dividing the air enclosure section 1 of shock absorbing material 2 into a vesicle 11, crevice 1a is formed in a part for a center section, and heights 1b is formed in a perimeter part, respectively. And between crevice 1a and heights 1b of these shock absorbing material 2 serves as a level difference 12. In case these shock absorbing material 2 is used to the protection object 3, as shown in drawing 7 , the protection object 3 is configurated so that crevice 1a may be contacted. Drawing 7 (A) shows the case where shock absorbing material 2 is configurated in the vertical direction of the protection object 3, and drawing 7 (B) shows the case where shock absorbing material 2 is configurated in the longitudinal direction of the protection object 3. In addition, when the comparatively small lobes 31, such as a switch, a terminal, and a dial, exist in the front face of the protection object 3, as shown in drawing 7 (A) and (B), about the sheet of crevice 1a of shock absorbing material 2, by forming crevice 1c in the part corresponding to a lobe 31 further, interference with a lobe 31 and shock absorbing material 2 can be avoided, and the protection object 3 can be held more certainly. Moreover, when concavities, such as a hole, exist in reverse on the front face of the protection object 3, it is also possible to form further the heights corresponding to crevice 1a of shock absorbing material 2 in reverse (not shown). By making shock absorbing material 2 into the above configurations, it shall respond to the various configurations of the protection object 3, and shall have the same user-friendliness as the conventional styrene foam. Moreover, this crevice 1a and heights 1b are good in the shock absorbing material 2 of one sheet also as what is prepared two or more places. moreover, crevice 1a and heights 1b (level difference 12) are formed so that various gestalten, such as a curvilinear configuration and the shape of linear [ of the direction of slant ], may be taken, and you may make it have the configuration which will be in the optimal contact condition to the protection object 3 according to the configuration of the protection object 3, and it can carry out by changing into versatility. In addition, although shock absorbing material 2 shall be used in the state of a flat surface in this example, it is good as what is used to the protection object 3, twisting as well as what was already explained above.

[0016]

[Effect of the Invention] By forming a level difference in a vesicle, by extracting the air with which could hold the protection object certainly and it filled up in the vesicle, the volume can be reduced easily and the shock absorbing material which is not bulky at the time of abolition, either can be offered in this application the 1st invention.

[0017] Moreover, in this application the 2nd invention, since the location of shock absorbing material is fixable with a junction means in addition to the 1st effect of the invention of this application, a protection object can be wrapped easily.

[0018] Moreover, in this application the 3rd invention, a protection object can be certainly held by forming heights and a crevice in the air enclosure section. And by extracting the air with which the air enclosure section was filled up, the volume can be reduced easily and the shock absorbing material which is not bulky at the time of abolition, either can be offered.

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**TECHNICAL PROBLEM**

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